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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,993	10/20/2003	Ok Byung Kim	1514.1031	1374
49455 7590 12/11/2007 STEIN, MCEWEN & BUI, LLP 1400 EYE STREET, NW SUITE 300 WASHINGTON, DC 20005			EXAMINER GUHARAY, KARABI	
			ART UNIT 2879	PAPER NUMBER
			MAIL DATE 12/11/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/687,993

Applicant(s)

KIM ET AL.

Examiner

Karabi Guharay

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on RCE, filed on 8/20/07.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,5,7 and 11-13 is/are pending in the application.
- 4a) Of the above claim(s) 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,7,11 and 12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 5/31/07; 8/20/07.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/20/07 has been entered.

***Response to Amendment***

Applicant's amendment and Remarks, filed on 8/20/07 have been considered and acknowledged by examiner.

New method claim 13 is added.

***Election/Restrictions***

Newly submitted claim 13 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-2, 4-5, 7, 11-12 are drawn to a display device classified in class 313, subclass 500.
- II. Claim 13, drawn to method for making the display device, classified in class 438, subclass 149.

Inventions of Group I and Group II are related as product and process of making it. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2)

that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process. For example, the product as claimed can be made as follows: polysilicon substrate is fabricated by excimer laser annealing method.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 13 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5, 7 & 11-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Mitnaga et al. (US 5923997).

Regarding claims 1 & 11-12, Mitnaga discloses a display device ( Active matrix LCD unit; lines 43-44 of column 7) with a polysilicon substrate (250; Fig 3b and 5a) comprising: a display region ( pixel region) and a driving region (peripheral region containing driving circuits), a first plurality of TFTs in the display region (PTFT & NTFT); a second plurality of thin film transistors (PTFT & NTFT) in the driving region

(lines 59-50 of column 7 and lines 63 of column 9- line 4 of column 10); primary crystal grain boundaries (216; figure 5B; column 14 lines 55-65) in the polysilicon substrate in the display region and in the driving region, secondary crystal grain boundaries in the polysilicon substrate in the display region and in the driving region (though Mitnaga is silent about secondary crystal grain boundary it is inherent that in crystallization process when crystals are growing, along with the primary grain boundary, secondary grain boundaries are formed perpendicular to the primary grain boundary direction); wherein the primary crystal grain boundaries are inclined to a first direction of current flowing from source to drain of each of the first plurality of TFTs at an angle of  $-30^{\circ}$  to  $30^{\circ}$  (figure 5b; see lines 1-6 of column 8 ; which teaches that in the pixel region crystal growth is in lateral direction, so in that case, primary grain boundaries are formed in the channel direction or current direction (since primary grain boundaries formed perpendicular to crystal growth direction so the grain boundaries in pixel region are parallel to the direction of current, thereby inclined at  $0^{\circ}$  angle); and the secondary crystal grain boundaries are inclined to a second direction of current flowing from source to drain (in this case 90 degrees, since secondary gain boundaries are perpendicular to primary boundaries) of each of the plurality of first plurality of TFTs in the display region and wherein the primary crystal grain boundaries are inclined to a second direction of current flowing from source to drain of each of the second plurality of thin film transistors at an angle of  $30^{\circ}$  to  $150^{\circ}$  (in the driving region direction of crystal growth is same as the current direction thus the primary grain direction is perpendicular to the current direction ,

see lines 6-16 of column ; so the primary crystal grain boundaries in the driving region are perpendicular to the current direction, would then be at an angle of  $90^\circ$ ), while the secondary crystal grain boundaries are inclined at the first direction of the current flowing from source to drain of each of the second plurality of TFTs (though it is not disclosed explicitly, it is inherently inclined to 0 degree in this case, since secondary grain boundaries are always perpendicular to the primary grain boundary).

In regard to claim 2, Mitnaga et al ('997) teach the primary crystal grain boundaries of each of the first plurality of TFTs in the display region are parallel to the direction of current (lines 1-6 of column 8).

In regard to claim 5, the Applicant is claiming a display device including a method (i.e.: process) of making the polysilicon substrate; consequently, claim 5 is considered a "product-by-process" claim. In spite of the fact that a product-by-process claim may recite only process limitations, it is the product and not the recited process that is covered by the claim. Further, patentability of a claim to a product does not rest merely on the difference in the method by which the product is made. Rather, it is the product itself, which must be new and not obvious (see MPEP 2113). Hence, Mitnaga et al's ('997) disclosure of a polysilicon substrate meets the structural limitation of the claimed invention.

In regard to claim 7, Mitnaga et al ('997) teach the primary crystal grain boundaries of each of the second plurality of transistors (TFTs used in the driving

circuits in the periphery constituting the driving region) are perpendicular to the second direction of current (lines 6-16 of column 8).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitnaga et al. (US 5923997).

In regard to claim 4, Mitnaga disclose all the limitations set forth, as described above, except the display device is an OLED. The Applicant, however, states that using TFTs in organic electroluminescent displays is known in the art in paragraph 9. The MPEP states that "[w]here the specification identifies work done by another as "prior art," the subject matter so identified is treated as admitted prior art. In re Nomiya, 509 F.2d 566, 571, 184 USPQ 607, 611 (CCPA 1975). Thus, it would have been obvious at the time of the invention to one of ordinary skill in the art to use the polysilicon substrate of Mitnaga as an OLED substrate. Motivation for combining would be to fabricate an active matrix OLED display.

***Response to Argument***

Applicant's arguments filed 8/20/07 have been fully considered but they are not persuasive.

Applicant contends that “Mitanaga discloses that in an LCD device, the TFTs prepared in the display portion for switching each pixel need not to have a so high mobility but it is necessary to minimize a leak current, i.e., the current when the TFT is in its off state. For this reason, the direction of the source and drain regions are so designed in such a manner that the current crosses grain boundaries formed within the channel regions of the TFT. Therefore, unlike previous embodiments, it is so designed that the direction in which the crystallization proceeds is perpendicular to the current flow direction in the TFT (FIG. 5C, column 15, lines 33-44). In other words, Mitanaga teaches that the primary crystal grain boundaries are perpendicular to the direction of the current flowing from the source to the drain in the display portion.”

Examiner respectfully differs. However, it is true that Mitanaga teaches the crystal growth is perpendicular to the direction of current flow. However, by definition primary grain boundaries are defined as boundaries formed perpendicular to the crystal growth direction (see applicant's disclosure paragraph 26). Thus primary grain boundaries in the pixel region are in the same direction as the direction of current, thus inclined at an angle of 0 degree. (Please see rejections above).



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### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karabi Guharay whose telephone number is 571-272-2452. The examiner can normally be reached on Monday-Friday 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Karabi Guharay  
Primary Examiner  
Art Unit 2879

12/4/07